



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,390	03/31/2004	Marcel Gaudet	250312US6 YA	5819
22850	7590	01/25/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER STOUFFER, KELLY M	
			ART UNIT	PAPER NUMBER
			1792	
			NOTIFICATION DATE	DELIVERY MODE
			01/25/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/813,390		GAUDET ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Kelly Stouffer		1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,7,8 and 10-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7,8 and 10-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/ are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 5 December 2007 have been fully considered but they are not persuasive. The applicant argues that Suda et al., in the combination of 35 USC 103 references used to reject claim 1 in the previous office action, teaches using CO or CO<sub>2</sub> to generate an oxygen plasma, but that there is no advantage to using CO or CO<sub>2</sub> over other oxygen-containing gases included in the reference. However, this limitation would have been obvious because the substitution of one known element, such as oxygen to from oxygen plasma, for another, such as CO or CO<sub>2</sub> that is taught as an alternative to oxygen by Suda et al., would have yielded predictable results and his therefore obvious to one of ordinary skill in the art at the time of the invention. See *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d 1385 (2007). The applicants further argue that Suda et al. does not teach cleaning a process chamber. However, Yeh et al., the primary reference does teach cleaning a process chamber, and therefore with the other references as combined in the previous office action teach the limitations of claim 1 (among others). Suda et al. is primarily used to show that CO or CO<sub>2</sub> can also generate oxygen plasma for use in Yeh et al. (or the other secondary references) instead of using oxygen. Though the applicant cites advantages the applicants have found in relation to using CO and CO<sub>2</sub> in the chamber cleaning process, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when

the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

The applicant argues that Yeh et al. teaches a wafer less cleaning process while the secondary references do not, and therefore one of ordinary skill in the art would not combine the references. In the rejection of the previous office action (and below), Yeh is used to teach the cleaning process with oxygen plasma, Suda teaches that one may substitute CO or CO<sub>2</sub> for oxygen when using oxygen plasma, and Sieber or Imai show that oxygen plasma is useful in removing fluorocarbon residue. Whether or not the secondary references have a wafer or not is not critical to the rejection. One of ordinary skill in the art would readily combine these references based upon their common objectives of using oxygen plasma to clean or etch surfaces. It is obvious and common sense to one of ordinary skill in the art that when one desires to clean the substrate holder during a chamber cleaning process the wafer should be removed. Because the substrate holder is also part of the chamber, it is exceedingly obvious that residue will eventually build up on the holder as well and will eventually need cleaned. Also, there are two options when cleaning an entire chamber as taught by Yeh. The wafer is either present on the substrate holder or it isn't, and removing a substrate from a substrate holder is most definitely within the technical grasp of one of ordinary skill in the art. According to *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d 1385 (2007): "a person of ordinary skill has good reason to pursue the known options with his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense."

Therefore, for at least these reasons, the rejections of the previous office action are maintained.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3-4, 7-8, 10-23 and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeh et al. (US 6545245) in view of Suda et al. (US 2004/0109263) and Sieber et al. (US 7041608) or Imai et al. (US 6057247).

As to claims 1, 7 and 27-30, Yeh et al. discloses a method for removing a photoresist based polymer residue from a plasma processing system including introducing a process gas into the process chamber, generating a plasma from the process gas (abstract), and exposing the residue to a wafer less dry cleaning process to form volatile reaction product without a shield wafer to clean the substrate holder (column 5 et seq.), and exhausting the reaction product from the process chamber (it is obvious that this occurs due to the pressures cited in column 4 et seq. and the implied use of vacuum pumps). Yeh et al. does not include cleaning a fluorocarbon residue (though this may be recognized as a fluoropolymer residue) and using CO gas to generate the plasma (instead Yeh et al. uses oxygen gas to generate the plasma in column 4 lines 10-30). Suda et al. teaches that CO gas or CO with nitrogen and argon may be used as an alternative to oxygen gas to generate oxygen plasma (paragraph 0082). This limitation would have been obvious because the substitution of one known element, such as oxygen to form oxygen plasma, for another, such as CO or CO<sub>2</sub> that is taught as an alternative to oxygen by Suda et al., would have yielded predictable results and is therefore obvious to one of ordinary skill in the art at the time of the invention. See *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d 1385 (2007). In addition, it is well known in the art that as both nitrogen and argon are inert gases, a

mixture of the two gases substituted for one or the other also yields predictable results and is obvious. Sieber et al. and/or Imai et al. teach that oxygen plasma is effective in removing fluorocarbon residue (Sieber et al. column 11 lines 10-17 and Imai et al. column 19 lines 25-35). Therefore, it would have been obvious at the time of the invention to modify Yeh et al. to use CO gas to generate the oxygen plasma as taught by Suda et al. as an alternative recognized in the art to clean fluorocarbon residue from the chamber as taught by Sieber et al. and Imai et al.

Regarding claim 3, Yeh et al. includes the substrate in the reaction chamber in column 5 et seq. and alternatively, Imai et al. includes the substrate in the process chamber for cleaning (entire document).

As to claim 4, Yeh et al. includes at least one manufacturing process before the cleaning is repeated (column 1 et seq. and column 2 lines 1-31).

As to claims 8, 10, 13-14, and 17-18, the claimed process gas flow rates, exposure times and chamber pressures are disclosed by Yeh et al. column 4 lines 20-31. Further, the exposure times are rendered a result effective variable by Yeh et al. in column 4 lines 20-61 and is modified depending upon the type of film cleaned, or etched from the chamber.

As to claims 11 and 12, inert gas including nitrogen or argon with the process gas CO is present in Suda et al. paragraph 0082. Sieber et al. teaches that modifying gases in the plasma (at it follows that their amounts are modified as well) in order to ensure that the fluorocarbon residue is etched or cleaned (column 11 lines 10-18), rendering this variable result-effective. Imai et al. Includes total gas flows, which would

include the inert gas flows, in the Embodiments. It is also noted by the examiner that since claim 12 only requires less than 2000 sccm, it would also include a flow rate of 0 sccm.

As to claims 15 and 16, the RF power, and hence corresponding frequencies, is disclosed by Yeh et al. in columns 4-5 lines 62-14. It is clear from this passage that the RF power is adjusted depending upon conditions in order to ensure that the desired parts of the process chamber are cleaned. Therefore, this variable is result-effective and its modification is obvious.

Regarding claims 19-23, Yeh et al. does not include optical monitoring. However, Imai et al. teaches optical monitoring is used for fluorine or carbon monoxide to check the progress of the process and stop the cleaning of the walls, where it is inherent that one could stop the plasma here if only cleaning the walls was desired (Imai column 6 lines 54-65, column 11 lines 31-67). Therefore, it would have been obvious to one of ordinary skill in the art to modify Yeh et al. to include optical monitoring as taught by Imai et al. in order to check the progress of the cleaning process.

Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeh et al. (US 6545245) in view of Suda et al. (US 2004/0109263) and Sieber et al. (US 7041608) or Imai et al. (US 6057247). as applied above, and further in view of US Patent number 5403434 to Moleshi.

Yeh et al., Suda et al. and Sieber et al. or Imai et al. are discussed above, but do not include using mass, particle, or plasma monitoring methods to monitor the cleaning



process progress. Moleshi teaches adjusting several parameters including these using a process control computer in order to reduce the cleaning exposure time (column 9 line 18-column 15 line 33).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yeh et al., Suda et al. and Sieber et al. or Imai et al. to include using mass, particle, or plasma monitoring methods to monitor the cleaning process progress as taught by Moleshi in order to reduce the cleaning exposure time.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly Stouffer whose telephone number is (571) 272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

Application/Control Number:  
10/813,390  
Art Unit: 1792

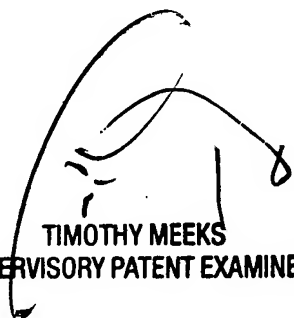
Page 9

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kelly Stouffer  
Examiner  
Art Unit 1792

kms



TIMOTHY MEEKS  
SUPERVISORY PATENT EXAMINER